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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/713,660

11/14/2003

Frank G. Belmonte

37,481

9847

4249

7590

03/02/2007

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EXAMINER

OH, TAYLOR V

ART UNIT

PAPER NUMBER

1625

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

03/02/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/713,660	Applicant(s) BELMONTE ET AL.	
	Examiner Taylor Victor Oh	Art Unit 1625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 29 and 30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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Applicant's arguments with respect to claims 1-28 have been considered but are moot in view of the new ground(s) of rejection.

The Status of Claims:

Claims 1-30 are pending.

Claims 1-28 have been rejected.

Claims 29-30 have been withdrawn .

DETAILED ACTION

1. Claims 1-28 are under consideration in this Office Action.

Priority

2. None.

Drawings

3. The drawings filed on 11/14/03 are accepted by the examiner.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, the phrase, the phrase "the at least one disubstituted benzene introduced in steps (a) and (d)" in the step (a) is recited.

However, the step (d) is previously nowhere mentioned in the step (a); therefore, the deletion of the step (d) is recommended. Therefore, an appropriate correction is required.

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Housley et al (US 2001/0007910) in view of Baldwin et al (US 3,092,658).

Housley et al teaches a process for producing carboxylic acids in the followings as seen from the abstract :

Improved process for producing carboxylic acids or their esters by catalytic liquid phase oxidation of a corresponding precursor in a suitable solvent comprising feeding the reactants to a first oxidation reaction zone at high pressure and high solvent ratio, wherein uptake of oxygen is limited to less than 50% of the oxygen required for full conversion of the precursor to its corresponding carboxylic acid, and then feeding the resulting reaction medium to a second oxidation reaction zone.

a mixture comprising (i) recycled solvent, recycled mother liquor and catalyst, line 11, (ii) reactor condensate from the second reactor, line 12, and (iii) fresh acetic acid make-up, line 13. The mixed feed stream will contain typical catalyst components (e.g., Co, Mn, Br), at generally diluted concentrations from what would normally be present when using a single conventional oxidation reactor. Optionally, but not shown, control of catalyst concentration in the first reaction zone can be achieved by bypassing some of the catalyst-containing mother liquor, line 11, directly to second reactor 20.

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[0033] The paraxylene feed 16 may optionally be pre-mixed with acetic acid solvent and introduced into the system either upstream or downstream of feed pump 14. Optionally, but not shown, a portion of paraxylene feed 16 may bypass reactor 15 and be fed directly to second reactor 20. The reaction medium which results in the first reactor has an acetic acid:paraxylene ratio in the range of from 10-25:1. Best results have been observed when the acetic acid:paraxylene mass ratio is from 10-20:1.

[0036] The feed stream to the first reaction zone, line 10, contains typical oxidation catalyst components (e.g., Co, Mn, Br), but diluted by a factor of about 3 to 5 relative to the catalyst concentration in recycled mother liquor from product recovery, line 11. The catalyst concentration is subsequently raised to more conventional catalyst concentration levels when and as solvent is vaporized and removed overhead in the second reaction zone 20. The total catalyst metals concentration in the first reaction zone will typically lie in the range 200 to 1,000 ppm w/w, whereas the catalyst metals concentration in the second reaction zone will typically lie in the range 600 to 3,000 ppm w/w. When using a Co and Mn metal catalyst system, the total catalyst metals concentration in the first reaction zone should preferably be controlled at greater than about 400 ppm w/w for good catalyst selectivity and activity.

[0037] The oxidation reaction is highly exothermic. Depending on the oxygen uptake and solvent ratio and without a means of cooling the reaction, the heat of reaction could raise the temperature of the first reaction medium to a value higher than the second reactor operating temperature and/or higher than 210° C. A relatively low first reactor exit temperature is desirable to minimize solvent and precursor degradation (i.e., burn) and to eliminate solvent flashing as the pressure of the reaction medium is reduced on entry into the second reaction zone. The first reaction zone may therefore include a cooling coil 18 or employ some other internal or external means for removing heat from the reactor (and reaction medium) to control the exit temperature of the reaction medium below 210° C., and preferably below the second reactor operating temperature. It is impor-

The instant invention, however, differs from the prior art in that 7 to 60 wt percent of the one disubstituted benzene is introduced ; the claimed temperature in the first oxidation stage is at least 5.5 ° F lower than that in the second oxidation stage.

Baldwin et al teaches a countercurrent oxidation system for oxidizing substituted aromatic hydrocarbons so as to produce carboxylic acids.

It is suitable for oxidizing mixed xylenes with an oxygen concentration of 8 to 9 percent (see col. 2, lines 3-4) in the presence of oxidizing catalyst selected from the group consisting of manganese, cobalt, nickel, chromium, vanadium, cerium or mixtures and a bromine promoter (see col. 3, lines 31-35) in the range of 1:10 to 10:1 atoms of catalyst metal per atoms of bromine (see col. 3, lines 42-46) to produce the mixed dicarboxylic acids in such a form that they may be separated into phthalic acid, terephthalic acid (see col. 1, lines 35-40). In addition, the preferred mixed metal catalysts are mixtures of manganese with cobalt acetate with a proportion of 1 to 2 parts by weight of manganese salt per part by weight of the other metal compound (see col. 3, lines 50-55).

In a staged three vessel countercurrent oxidation system the first stage should be operated at 50-300, e.g. 175 p.s.i., 320-420, e.g. 375° F., with a 1:1 to 5:1 acetic acid to hydrocarbon ratio and for a time of about .1 to 1 hour, e.g. 30 minutes. The second stage should be at a higher pressure than the first, i.e. 100-400 or about 300 p.s.i., at approximately the same temperature, e.g. 340-420 or about 380° F., with about the same solvent ratio and contact time as the first stage but preferably with a somewhat higher oxygen concentration. The last stage should be at the highest pressure, e.g. 200-500 or about 400 p.s.i., the highest temperature, e.g. 360-440 or about 400° F., and at the highest oxygen concentration, preferably air at the inlet side but in amounts to avoid exceeding 8 percent oxygen in the off-gas therefrom. (see col. 2, lines 30-45).

Furthermore, the stage-wise continuous counter current oxidation system will avoid explosion hazards and result in the attainment of product quality (see col. 1 ,lines 41-44).

Moreover, some water and solvent are recycled from the each of the latter reactors to the preceding reactor along with the gas stream (see col. 4 ,lines 46-49) as shown in fig 2 (a front page).

Concerning the introduction of 7 to 60 wt percent of the one disubstituted benzene into the first reactor, the limitation of a process with respect to time, temperature , and concentration does not impart patentability to a process when such values are those which would be determined by one of the ordinary skill in the art in achieving optimum operation of the process. The concentration of the initial material in the oxidation process is well-understood by those of ordinary skill in the art to be a result-effective variable., especially when attempting to control selectivity of the process.

Housley et al expressly teaches a process for producing carboxylic acids by feeding paraxylene, oxygen , acetic acid , some catalyst in a series of two reactors; Baldwin et al expressly teaches the countercurrent oxidation system for oxidizing substituted aromatic hydrocarbons so as to produce the corresponding carboxylic acids in a series of two reactors under specific reaction conditions (e.g. specific molar ratio of the catalyst, the reaction temperature of the second reactor). Both prior art processes are commonly involved with the oxidation of the substituted aromatic hydrocarbons so as to produce the corresponding carboxylic acids under similar reaction conditions (catalyst composition and reaction temperature).


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Furthermore, Baldwin et al has offered guidance that the stage-wise continuous counter current oxidation system will avoid explosion hazards and result in the attainment of product quality (see col. 1 ,lines 41-44). Therefore, it would have been obvious to the skilled artisan in the art to be motivated to incorporate the teaching of Baldwin et al into the Housley et al process in order to achieve a high quality desired product with less hazards.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Taylor Victor Oh whose telephone number is 571-272-0689. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas McKenzie can be reached on 571-272-0670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Taylor Victor Oh, MSD,LAC
Primary Examiner
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2/28/07